

ASOS MODIFICATION NOTE 78, REVISION A (for Electronics Technicians)

Maintenance, Logistics, and Acquisition Division

W/OPS12: MJW

SUBJECT: Installation of the Automated Surface Observing System (ASOS) Ott All Weather Precipitation Accumulation Gauge (AWPAG)

PURPOSE: To provide instructions for removing the Frise Model 7405 Liquid Precipitation Accumulation Sensor (Rain Gauge) and installing the Ott AWPAG in its place in the ASOS sensor array.

EQUIPMENT AFFECTED: ASOS Data Collection Package (DCP), Single Cabinet ASOS (SCA), and ASOS Frise Rain Gauge

PARTS REQUIRED: Parts included in shipments (*Parts 1 through 5 are included in a complete AWPAG System [S100-2MT6-3]*):

1. **AWPAG Sensor Box** containing:
 - (1) Sensor balance mechanism with integral "LOGOSense" data logger (**S100-2MT6-3A1A3**)
 - (1) Bucket mounting plate with level
 - (1) Miscellaneous hardware bag containing:
 - (3) Bucket mounting plate screws
 - (3) Pipehouse mounting knobs
 - (3) Bucket mounting plate split lock washers
 - (1) 3mm Allen wrench
2. **AWPAG Pipehouse Box** containing:
 - (1) Pipehouse (**S100-2MT6-3A1A2**)
 - (1) AWPAG collection bucket (**S100-2MT6-3A1A1**)
3. **AWPAG Windscreen Upright Box** containing (part of **S100-2MT6-3A3**):
 - (4) AWPAG windscreen upright supports
4. **AWPAG Windscreen Frame Box** containing (part of **S100-2MT6-3A3**):
 - (1) AWPAG windscreen frame base
 - (6) 1/4" stainless split lock washers for splice plate
 - (5) AWPAG windscreen frame horizontal members
 - (4) AWPAG windscreen (Tretyakov shield) mounting knobs
 - (1) AWPAG windscreen mounting frame
 - (47) M8 x 16 metric stainless hex head bolts
 - (31 for windscreen frame, 16 for lamellas)
 - (47) M8 x 16 metric stainless nuts (with treated threads)
 - (31 for windscreen frame, 16 for lamellas)
 - (16) Windscreen lamellas (**S100-2MT6-3A3MP1**)

	<ul style="list-style-type: none">5. AWPAG Electronics Enclosure Box containing (S100-2MT6-3A2):<ul style="list-style-type: none">(1) AWPAG electronics enclosure with power cable and fiber-optic cable attached(4) M8 x 16 metric stainless hex head bolts(4) M8 x 16 metric stainless nylon-insert locknuts(2) lengths of bare copper wire 10 gauge or larger for safety ground6. Power Control Module (S100-2A1A3A5-1)7. AWPAG Ancillary Equipment (<i>may ship separately</i>)<ul style="list-style-type: none">(1) AWPAG pump assembly kit (S100-TE163)(1) AWPAG volumetric flask (S100-TE165)(1) Antifreeze test strips (S100-TE169)
SPECIAL TOOLS AND MATERIALS REQUIRED:	<ul style="list-style-type: none">1. Level2. Anti-seize compound (Permatex 133AR or equivalent to be procured locally)3. Pull line (to be procured locally) (length will vary from site to site)4. Two gallons of propylene glycol antifreeze (to be ordered from NLSC by sites experiencing solid precipitation) (NSN 6850-01-288-7922)5. One-half gallon of water6. Small tarp7. Electrical tape or equivalent to secure new wires to pull string8. Silicone sealant (Dow Corning RTV 732 or equivalent to be procured locally)
MODIFICATION PROCUREMENT:	The parts required will be issued to the supporting WFOs from the National Logistics Support Center (NLSC) except for items to be procured locally. (See Special Tools and Materials Required.)
EFFECTIVITY:	This modification note applies to ASOS sites listed in attachment B.
ESTIMATED TIME REQUIRED:	Four to six hours.
EFFECT ON OTHER INSTRUCTIONS:	None.
AUTHORIZATION:	This modification is authorized by Request for Change S01142.
VERIFICATION STATEMENT:	This modification note has been tested for operational integrity by the NWS at the Sterling Research and Development Center, Sterling, Virginia.
SPECIAL INSTRUCTIONS:	<ul style="list-style-type: none">1. Modification Note 73 must be completed prior to this modification. Modification Note 73 directs the installation of the ACU processor board upgrade. The ACU processor board software must be V2.7B or higher.2. The AWPAG site preparation for the windscreen foundation must be completed prior to this modification.

GENERAL:

This modification note provides directions to remove the current Frise Rain Gauge and install and configure the new Ott AWPAG in its place.

INTRODUCTION:

The Ott AWPAG is the replacement precipitation accumulation gauge for NWS ASOS. The AWPAG will be installed on the same pedestal where the Frise Rain Gauge is currently installed.

Site preparation must be completed prior to this installation. The foundation consists of four concrete piers installed below grade around the pedestal. The tops of the foundation piers will be approximately 6 inches above ground level. Windscreen mounting bolts will be imbedded into the foundation. The windscreen mounting hardware will be left in place on the mounting bolts.

This modification will also be installed at the following platform sites: PMCG, PTKA, PYAK, BLU, and SMP. At these sites a windscreen mounting frame will be attached to the platform. The AWPAG windscreen frame base, upright housing, and windscreen will be installed on this frame. Special platform mounting instructions will be provided as a separate instruction for these sites.

The AWPAG electronics enclosure box will be attached to the AWPAG windscreen mounting frame. New AWPAG power conductors and fiber-optic cables will be installed in the raceway between the AWPAG pedestal and the DCP.

Technicians should allow 4 to 6 hours for installation. In the event that work is suspended for an extended period, all case covers should be replaced.

After removal, return the Frise Rain Gauge, windshield, and power and fiber-optic cables to the National Reconditioning Center. Use any of the AWPAG shipping materials to package these items for shipment. Remove the tipping bucket from the rain gauge and wrap it separately. Complete and attach an H-14 tag to each rain gauge. Ship these items to the following address:

NOAA/NWS/National Reconditioning Center
Instrument Inspection Unit, W/OPS161
520 East Bannister Road, Building 1
Kansas City, MO 64131-3009
Telephone number: (816) 823-1058 x 242

PROCEDURES:**Before Installing the AWPAG**

1. Call the ASOS Operations and Monitoring Center at 800-242-8194 to report the installation.
2. At NWS-staffed sites, obtain permission from the responsible MIC/OIC/forecaster/observer before starting the installation. In addition, ensure that the ASOS is operating when synoptic observations are taken at 00, 03, 06, 09, 12, 15, 18, and 21Z.
3. Immediately before turning off power to the DCP at NWS-staffed sites, ask the MIC/OIC/forecaster/observer to notify the tower and any other critical users that the ASOS will be turned off for installation of a new sensor. At unstaffed sites, notify the air traffic control tower using controller video displays and operator interface devices or by telephone. This step should be repeated each time power to the DCP is turned off.
4. Begin the installation process immediately following the transmission of an hourly observation. At NWS-staffed sites, normal backup observing procedures will be implemented.
5. At sites without an OID, attach a terminal to the primary OID port of the ACU (1A9J22) or connect the laptop to the DCP as OID #8 before proceeding.

Turning Off Frise Rain Gauge Processing

6. At the OID log on to the ASOS as TECH.
7. Key **MAINT-ACT-FMK** and enter Mod Note 78.
8. Key **MAINT-ACT-FMK-START**.
9. Proceed to the Sensor Status Page (**REVUE-SENSR-STAT**) and turn off report processing for the TIPPING BUCKET.

Removing the Frise Rain Gauge

10. Turn off power to the Frise Rain Gauge at the power control module in the DCP.
11. Remove the windshield:
 - a. First remove the three ¼ x 20 hex head screws holding the upper ring to the legs and lifting the windshield assembly off the legs.
 - b. Then remove the three legs by pulling each leg up from the pedestal base plate.
12. Loosen the two knurled retaining knobs that secure the collector to the lower case.
13. Lift the collector straight up and remove it from the lower case.
14. Carefully remove the tipping bucket by tilting and lifting it from the tipping bucket frame.

15. Disconnect the grounding wire from the system ground at the raceway. Retain the split bolt grounding connector for connection of the AWPAG grounding wire. Replace the split bolt as necessary.
16. Remove the four pedestal mounting bolts and associated hardware that secure the windshield base plate and rain gauge.
17. Spread a small tarp on the ground next to the pedestal. Remove the lower case, rain gauge legs, windshield, and rain gauge base plates assembly by pulling it up from the pedestal. Lay the assembly on its side on the tarp.
18. Loosen and remove the six screws and lock nuts that secure the three rain gauge base plate legs to the lower case. Remove the legs from the fittings.
19. Remove the four screws securing the bottom plate to the lower case. Pull the bottom plate down from the lower case to expose the electrical connections.
20. Disconnect the three heater power connectors from terminals 3, 4, and 5 on the terminal board on the bottom plate.
21. Disconnect the fiber-optic cable from the fiber-optic transmitter on the bottom plate.

CAUTION

Special care is required to avoid damaging both the existing and new fiber-optic cables. Avoid using excessive force when drawing fiber-optic cables and power conductors through the conduit and raceway between the pedestal and the DCP.

22. Disconnect the flexible conduit from the bottom plate. Carefully pull the power conductors and fiber-optic cable through the opening in the bottom plate.
23. Remove the access plate closest to the pedestal on the top of the raceway.
24. Disconnect the flexible conduit from the opening on the side of the raceway and carefully remove the power conductors and fiber-optic cable from it.
25. Remove the conduit connector from the opening on the side of the raceway.
26. Pull the power conductors and fiber-optic cable through the opening on the side of the raceway and out the opening on the top of the raceway.
27. Reassemble the Frise Rain Gauge, the lower case, upper case, and frame. Wrap the fittings and base plate and place in a rigid box. Always pack the legs and base plate in a separate box from the gauge assembly and other components. Retain the Frise Rain Gauge, tipping bucket, windshield, and power and fiber-optic cables for later shipment to the National Reconditioning Center (see page 3).

Turning Off Power to the DCP

28. Turn off power to the DCP at the circuit breaker.

Replacing the Power Control Module in the DCP or SCA

29. For DCP systems, remove the power control module for the Frise Rain Gauge and install in its place the new power control module provided by the NLSC. Record the alpha-numeric position of the power control module in the circuit breaker module rack (refer to the ASOS Site Technical Manual [STM], Figure 3.1.5, Circuit Breaker Module Rack - Stuffing Chart); this information will be required in step 35 to identify the associated fiber-optic module.

For SCA systems, remove the heater control breaker for the Frise Rain Gauge from position 7A1A1A3 (Circuit Breaker Panel). Install part number S100-2A1A3A8CB1 in its place. Install the other breaker, part number S100-2A1A3A2CB1, in the next available slot. Record the alpha-numeric positions of the circuit breakers in the panel (refer to the ASOS STM, Table 14.3.1, Circuit Breaker Panel 7A1A1A3 Controls and Indicators); this information will be required in step 35 to identify the associated fiber-optic module.

30. Open the Faraday box.

Unpack the AWPAG

The AWPAG is equipped with a highly sensitive electronic balance system. Inappropriate handling can lead to damage and can result in unusable measurement results. Please be sure to adhere to the following:

- Avoid jolting and shocks during transport and installation.
- Only transport the device with the shipping locks in place.
- Do not touch the traverse bars on the balance system (see **Figure 1**).

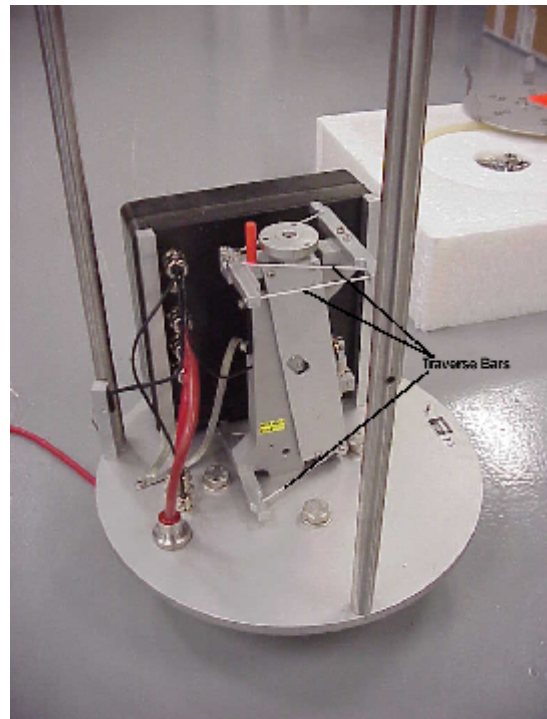


Figure 1

**Installing the Power Conductors and Fiber-optic Cable
From the AWPAG Electronics Enclosure to the DCP**

31. Spread a small tarp on the ground next to the rain gauge pedestal. Place the AWPAG electronics enclosure on the tarp.
32. If not already installed, install the conduit connector provided with the AWPAG electronics enclosure in the opening on the side of the raceway at the rain gauge pedestal.
33. Carefully pass the five power conductors (black, white, red, green, and yellow) and the fiber-optic cable that extend from the end of the conduit attached to the base of the AWPAG electronics enclosure through the opening on the side of the raceway and out the opening on the top of the raceway.
34. Connect the compression fitting on the AWPAG electronics enclosure conduit to the connector on the side of the raceway.
35. In the DCP, disconnect the fiber-optic cable from the bottom of the appropriate fiber-optic module. Refer to the ASOS STM, Table 3.4.1, Port Assignments for DCP SIO Boards, to determine the appropriate fiber-optic module to disconnect. (For 2A1A3A5, disconnect fiber-optic module 5). From the DCP end, carefully pull the fiber-optic cable through the raceway, through the conduit connected to the raceway, and out of the DCP.
36. In the Faraday box, disconnect the three power conductors that provided power to the Frise Rain Gauge at the terminal strip. These conductors are connected to 2A3A17-22B, 2A3A18-22B, 2A3A18-22GND. Secure one of the conductors at the pedestal end to be used as a pull line later. From the DCP end, pull the other two conductors through the raceway, through the conduit connected to the raceway, and out of the DCP.
37. At the sensor end, attach the five AWPAG power conductors to the remaining power conductor. Attach the fiber-optic cable to the power conductors further back from the remaining power conductor. Replace and seal the raceway cover removed in step 25.
38. From the DCP end, using the remaining power conductor as a pull line, carefully draw the attached five AWPAG power conductors and fiber-optic cable through the raceway, through the conduit connected to the raceway, and out the opening at the DCP.

Connecting the AWPAG Power Connectors to the Terminal Block in the Faraday Box

39. At the DCP, connect the power conductors for the AWPAG as follows:

Black	2A3A17-6B
White	2A3A18-6B
Green	2A3A18-6GND
Red	2A3A17-22B
Yellow	2A3A18-22B

Attaching the AWPAG Fiber-optic Cables to Fiber-optic Module

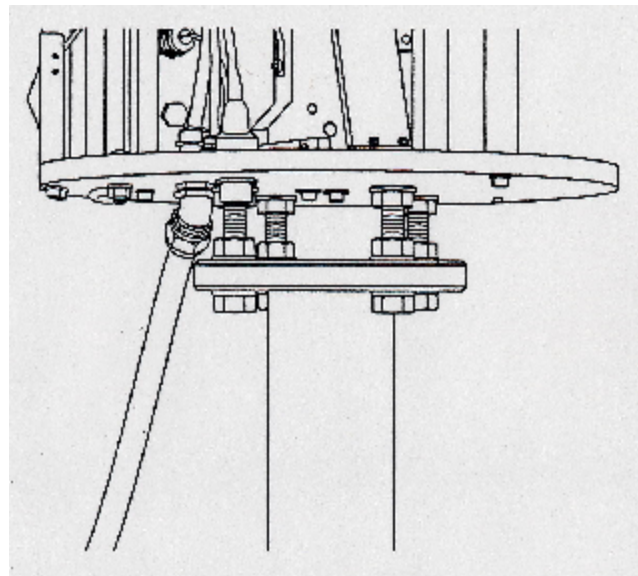
40. At the DCP, connect the fiber-optic cable for the AWPAG in the position it was disconnected from in step 35.

Closing the Faraday Box and Restoring Power to the DCP

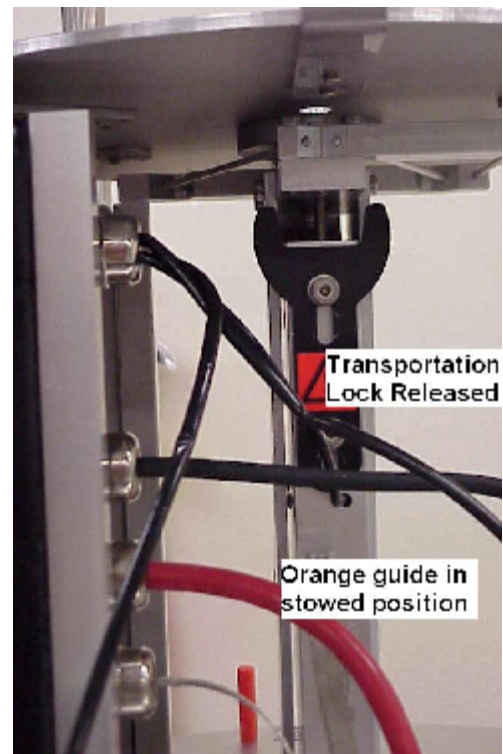
41. Close the Faraday box in the DCP.
42. Turn on power to the DCP at the circuit breaker.
43. Verify that the DCP and all sensors except the AWPAG are operational. Correct any problems before proceeding to the next step.

Installing the AWPAG on the ASOS Pedestal

44. Remove the four lower nuts and eight washers from the bolts at the bottom of the AWPAG sensor balance mechanism (see **Figure 2**). Leave the four upper nuts in place on the bolts.
45. Place one of the washers removed in step 44 over each of the four openings on the flange on the ASOS pedestal.
46. Mount the AWPAG Sensor Balance Mechanism onto the pedestal so that the black electronics housing is on the DCP side of the raceway.
47. Apply anti-seize compound to the pedestal mounting bolts. Fasten the AWPAG Sensor Balance Mechanism to the flange using the four remaining washers and the four nuts that were removed in step 44. Do not tighten the nuts at this time.

**Figure 2**

48. Carefully place the bucket mounting plate on the AWPAG Sensor Balance Mechanism (see **Figure 3**). The opening in the plate must be placed over the orange plastic guide on the balance mechanism. Fasten the plate to the balance mechanism using the three Allen head screws and washers that were supplied with the plate. Use the Allen wrench supplied with the AWPAG. Tighten until snug.
49. Using the four pedestal mounting bolts for adjustment, level the bucket mounting plate until the sight level indicator on the bucket mounting plate is centered. Tighten all mounting hardware after adjustments.
50. Check the bubble level to verify that the plate is still level. If it is not, repeat step 49.
51. Release the black, wrench-shaped shipping lock on the AWPAG Sensor Balance Mechanism by loosening the two Allen head screws that secure it (see **Figure 4**). Allow the shipping lock to drop to a lower position on the base. The shipping lock will remain on the balance mechanism. Tighten the screws to secure the lock.
52. Remove the orange plastic guide and place it onto the screw provided near the edge of the AWPAG Sensor Balance Mechanism (see **Figure 4**).

**Figure 3****Figure 4**

53. For sites that experience freezing temperatures, fill the collection bucket with 2 gallons of propylene glycol antifreeze and $\frac{1}{2}$ gallon of water (4:1 ratio). Propylene glycol is hydroscopic and will absorb moisture from the air until saturated, resulting in false reporting of precipitation. During winter months, sites that experience solid precipitation will adjust their AWPAG propylene glycol and water mixtures to act as an antifreeze agent using a table that will be provided in the ASOS Site Technical Manual.
For sites that do not experience freezing temperatures, no action is necessary.
54. Place the collection bucket on the AWPAG Sensor Balance Mechanism (see **Figure 5**).
55. Place the AWPAG pipehouse over the collection bucket and onto the measuring unit. Align the pipehouse mounting holes with the holes in the three balance mechanism support rods. Secure the pipehouse using the three knurled retaining knobs provided with the AWPAG.
56. Connect the pipehouse cable to the bottom of the AWPAG Sensor Balance Mechanism.



Figure 5

Installing and Attaching the AWPAG Windscreen Frame

57. Remove the cap nut, hex nut, and 1 washer from each of the mounting bolts on top of the four windscreen foundation piers (**Figure 6**).



Figure 6

58. Install the windscreen mounting frame (welded on corners) on the foundation mounting bolts using the hardware just removed.

NOTE: At some sites, it may be necessary to adjust the ASOS raceway height to accommodate the windscreen mounting frame cross brackets. The raceway should be carefully set such that it slopes slightly away from the DCP to prevent moisture accumulation. Be careful not to over-tighten the U-bolts, as they are prone to snapping.

59. Assemble the upright members to the base sections using the hardware provided with the kit (see **Figure 7**).

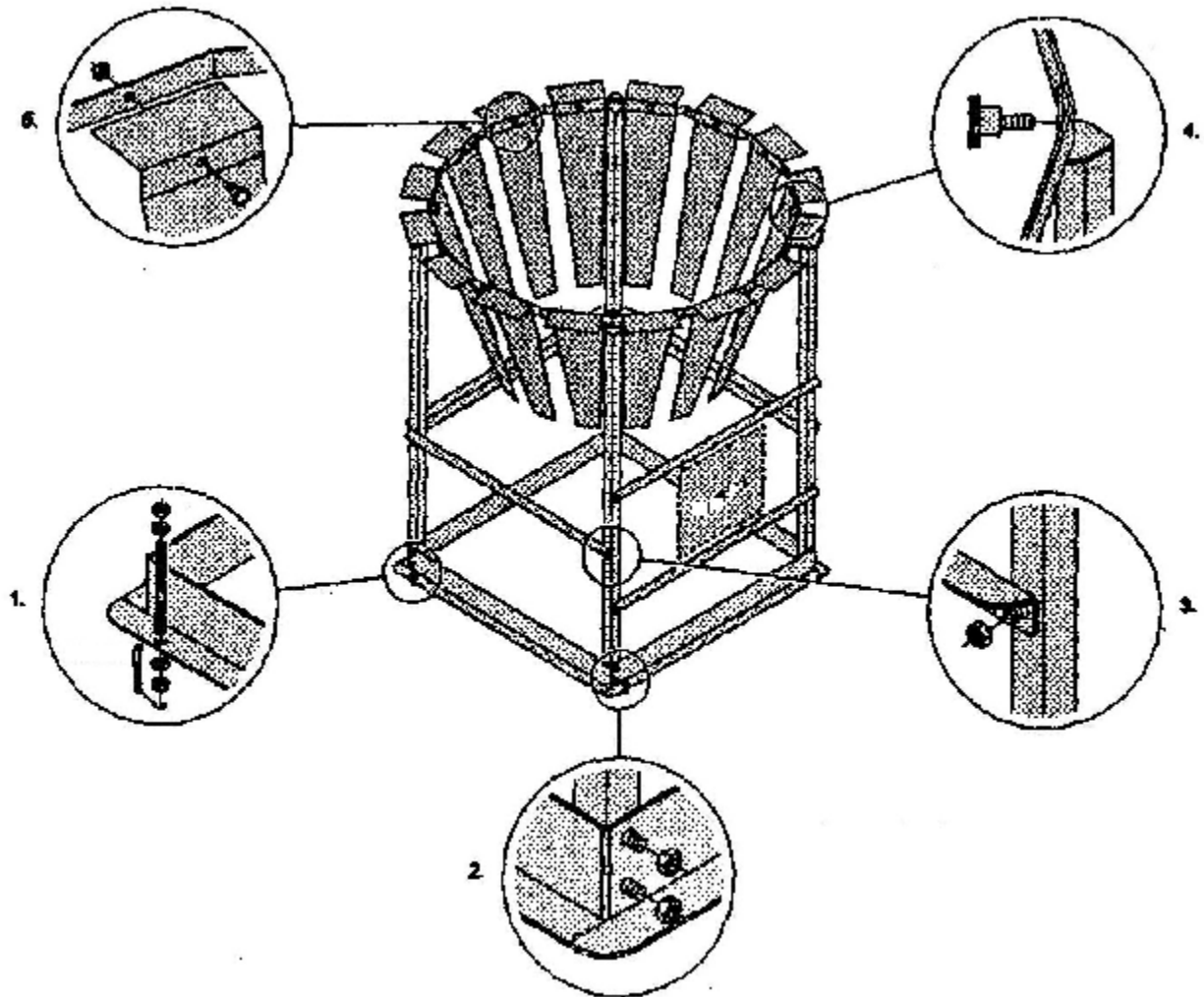


Figure 7

NOTE: At sites with elevated pedestals (spools), additional upright sections will be provided under a separate modification note. Notify W/OST11 at 301-713-1975 x113 if the site selected for installation has elevated pedestals.

60. Attach the cross-braces using the hardware provided with the kit.

61. Assemble the windscreen by attaching the lamellas to the inside of the metal windscreen mounting frame provided with the AWPAG (see **Figure 8**).

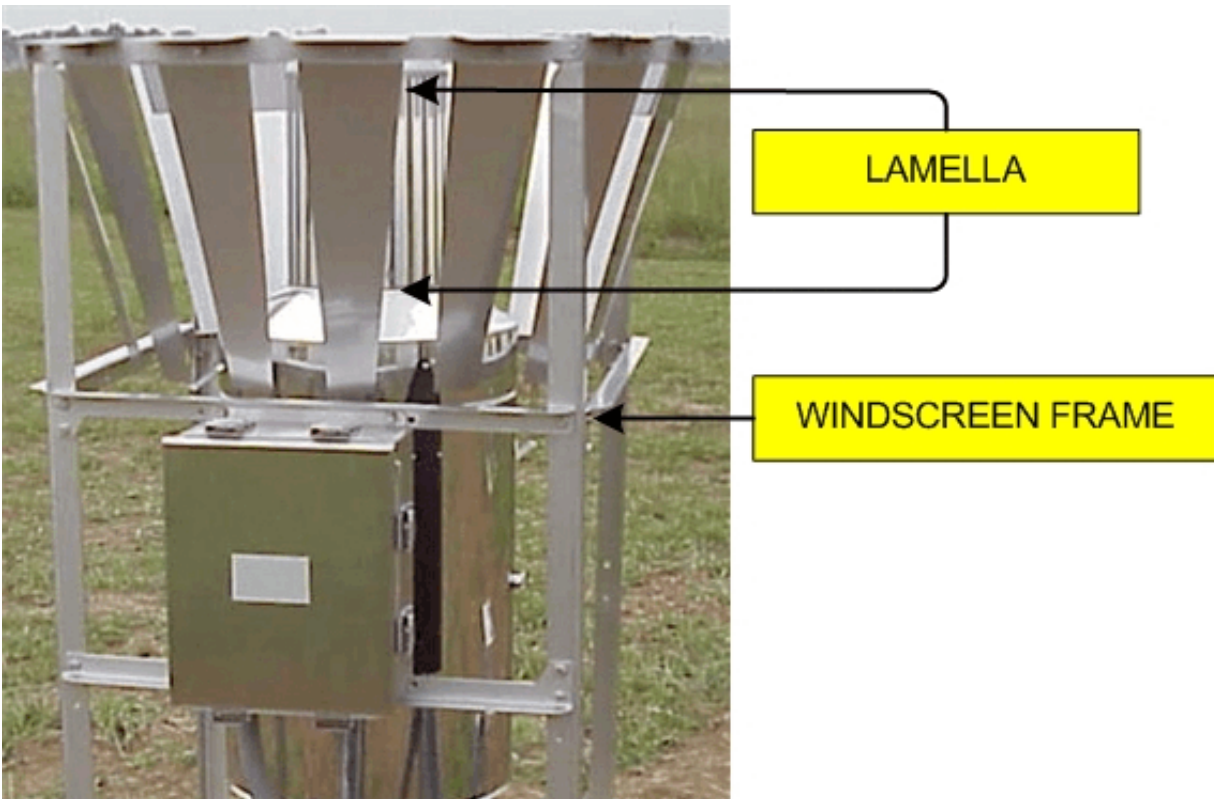


Figure 8

62. Place the windscreen on top of the mounting frame. Fasten the windscreen ring using the four knurled knobs provided with the AWPAG. Install the knobs from the inside of the windscreen ring.
63. The windscreen ring should be level and approximately 0 to ½ inch above the top of the AWPAG pipehouse. This is accomplished by adjusting the foundation mounting hardware.
64. Attach the AWPAG electronics enclosure to the housing using the four bolts and nuts provided with the AWPAG. Apply anti-seize compound to all fasteners that are not pretreated.

Connecting the Power Conductors and Signal Cables in the AWPAG Electronics Enclosure

65. Feed the power conductors and signal cables that pass through the conduit attached to the bottom of the AWPAG Sensor Balance Mechanism through the right opening in the bottom of the AWPAG electronics enclosure.
66. Connect the compression fitting on the conduit attached to the bottom of the balance mechanism to the right opening in the bottom of the electronics enclosure.
67. Connect the four conductors from the AWPAG inside the electronics enclosure following the directions on the schematic diagram on the enclosure door (see **Figure 9**).

Connecting the AWPAG Grounds

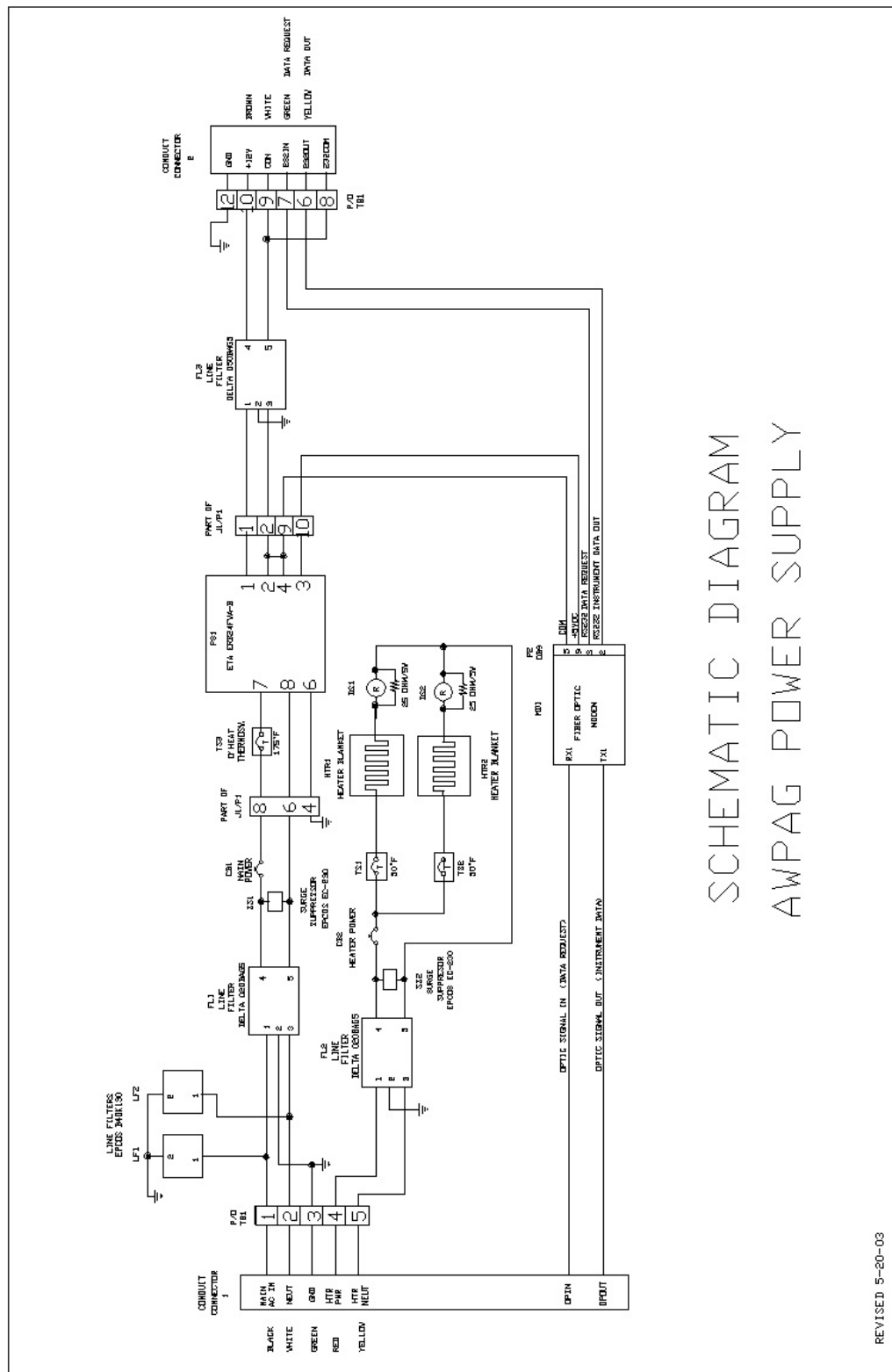
68. Connect one of the ground wires provided with the AWPAG from the ground lug on the bottom of the AWPAG electronics enclosure to the system ground. Use the split bolt grounding connector that was used to connect the Frise Rain Gauge ground. Connect the other ground wire provided from the ground lug on the bottom of the AWPAG Sensor Balance Mechanism to the ground lug on the bottom of the electronics enclosure.

Turning On Power to the Electronics and Heater of the AWPAG

69. In the DCP, turn ON power to the electronics and heater of the AWPAG at the power control module, installed in step 29.

Turning On Processing

70. At the OID, log on to the ASOS as TECH.
71. Proceed to the Software Versions Page (**REVUE-SITE-VRSN-SW**). Confirm that the ACU Memory Software Version for the DCP is V2.7B. If it is not, install the correct memory in the DCP before proceeding. Select **MAINT-PROC-DCP1-HARD RESET** to force a download of V2.7B to the DCP.
72. Proceed to the Sensor Configuration Page (**REVUE-SITE-CONFIG-SENSR**). Configure the AWPAG by entering **FP** in the field for Port 4-1.
73. Proceed to the Define Configuration Page (select **BACK-DEFIN**). Press the **CHANGE** key. Scroll down to PRECIP ACCUM. Press the **SEQN** key to define the Ott AWPAG as the primary precipitation accumulation gauge. Select **EXIT**.



Performing Final Checkout of the AWPAG — Verifying Calibration

74. Proceed to the Maintenance Page for the AWPAG (**MAINT**, scroll to **DCP** and select, scroll to **AWPAG** and select). Execute the **PRACC** command to clear the sensor. Note the values in the AMOUNT IN BUCKET and PRECIP ACCUM fields (PRECIP ACCUM should equal 0).
75. Fill the volumetric flask (S100-TE165) to the 500 mL line using ordinary tap water. Pour the water into the AWPAG slowly, such that the entire flask requires approximately 2 minutes to empty. Note that if the water is added too quickly, the AWPAG will not recognize the accumulation. This feature eliminates false reporting due to foreign objects falling into the bucket.
76. At the OID, verify that within 4 minutes of adding the water the PRECIP ACCUM field indicates an increase of 0.98 inch (± 0.02), and the AMOUNT IN BUCKET field indicates an increase of 0.98 inch (± 0.02) of precipitation from the values displayed in step 75. If the sensor does not report correctly, repeat step 75, paying close attention to fill the bucket more slowly. If after repeating step 75 the sensor does not report correctly, replace the Sensor Balance Mechanism.
77. If the sensor reports within the specified range, press the **PRACC** key to reset the accumulated precipitation value to 0.00 inch. Select **EXIT**.
78. Proceed to the Sensor Status Page (**REVUE-SENSR-STAT**) and scroll down to PRECIP ACCUM to turn **ON** report processing for the AWPAG.
79. Make a note in the SYSLOG that the "Calibration Verification was performed according to Modification Note 78, and Accumulated Precipitation was reset to 0 inches."

Performing Checkout of Other Sensors

80. Verify that all sensors are operational, reviewing the **SYSLOG** for any unintended sensor status changes. Correct any problems.

REPORTING INSTRUCTIONS:

Report completed modification using the Engineering Management Reporting System (EMRS) according to NWS Instruction 30-2104, Maintenance Documentation, Part 4, and Appendix D. Include the following information on the EMRS Report:

1. An equipment code of **AWPAG** in block 7.
2. The appropriate serial number in block 8. (The AWPAG serial number is located outside the stainless steel sensor shell on a label next to the channel that contains the sensor wiring.)
3. A modification number of **78** in block 17a.

See attachment A to this modification note for a completed sample of the EMRS Report.

Mark S. Paese
Director, Maintenance, Logistics, and Acquisition Division

Attachment A - Sample EMRS Report
Attachment B - AWPAG Locations

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Attachment A - Sample EMRS Report

New A26 Commit A26 Place on Hold Cgpy A26 Delete A26 Detail Report Document Summary Help									
GENERAL INFORMATION									
NEW RECORD WFO* ABR Document No.* ABR40616000									
1. Open Date	Open Time	2. Op Initials	3. Response Priority		4. Close Date	Close Time			
06/15/2004	08:00	WSH	<input type="radio"/> Immediate <input type="radio"/> Low <input type="radio"/> Routine <input checked="" type="radio"/> Not Applicable		06/15/2004	14:00			
5. Maintenance Description 420 characters left ASOS									
ASOS Mod Note 78 - ASOS Ott All Weather Precipitation Accumulation Gauge (AWPAG)									
EQUIPMENT INFORMATION									
6. Station ID*	7. Equipment Code	8. Serial Number		9. TM	10. AT	11. How Mal			
ABR	AWPAG	000A		M	M	999			
Alert: Time Remaining: (For Block 12 use only)									
13. PARTS USAGE and CONFIGURATION MANAGEMENT REPORTING									
ASN	Vendor Part No. (New Part)	Serial Number (Old Part)	Serial Number (New Part)	New Row					
				Delete Row					
14. WORKLOAD INFORMATION									
a. Routine		b. Non-Routine		c. Travel		d. Misc		e. Overtime	
Hours	Minutes	Hours	Minutes	Hours	Minutes	Hours	Minutes	Hours	Minutes
						6	0		
MISCELLANEOUS INFORMATION									
15. Maintenance Comments 660 characters left									
ASOS Mod Note 78 - Installed ASOS Ott All Weather Precipitation Accumulation Gauge (AWPAG)									
16. Tech Initials									
AEH									
17. SPECIAL PURPOSE REPORTING INFORMATION									
a. Mod No.	b. Mod Act/Deact Date	c. Block C	d. Trouble Ticket No.	e. Block E					
78	06/15/2004								
Commit A26 Place on Hold Cgpy A26 New A26 Cancel									

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Attachment B - AWPAG Locations

SID	LOCATION	ST	AGN	S/L
NWS LOCATIONS				
12N	Andover	NJ	NWS	D
1V4	St. Johnsbury	VT	NWS	O
2WX	Buffalo	SD	NWS	O
40J	Perry-Foley	FL	NWS	D
6R6	Dryden	TX	NWS	D
87Q	Pt. Piedras Blancas	CA	NWS	O
8D3	Sisseton	SD	NWS	D
9V9	Chamberlain	SD	NWS	D
AAF	Apalachicola	FL	NWS	D
AAT	Alturas	CA	NWS	D
ABE	Allentown	PA	NWS	C
ABI	Abilene	TX	NWS	C
ABQ	Albuquerque	NM	NWS	A
ABR	Aberdeen	SD	NWS	D
ACT	Waco	TX	NWS	C
ACY	AtlanticCity	NJ	NWS	C
ADQ	Kodiak	AK	NWS	B
AGS	Augusta	GA	NWS	C
AHN	Athens	GA	NWS	C
AKN	KingSalmon	AK	NWS	B
AKQ	Wakefield	VA	NWS	D
ALB	Albany	NY	NWS	B
ALO	Waterloo	IA	NWS	C
ALS	Alamosa	CO	NWS	D
AMA	Amarillo	TX	NWS	B
ANC	Anchorage	AK	NWS	A
ANJ	SaultSte.Marie	MI	NWS	D
ANN	AnnetteIsland	AK	NWS	D
APN	Alpena	MI	NWS	D
AST	Astoria	OR	NWS	D
ATL	Atlanta	GA	NWS	A
ATT	Austin	TX	NWS	D

SID	LOCATION	ST	AGN	S/L
AVL	Asheville	NC	NWS	C
AVP	Wilkes-Barre/Scranton	PA	NWS	C
BDL	WindsorLocks	CT	NWS	A
BDR	Bridgeport	CT	NWS	C
BET	Bethel	AK	NWS	A
BFF	Scottsbluff	NE	NWS	D
BFL	Bakersfield	CA	NWS	C
BGM	Binghamton	NY	NWS	C
BIH	Bishop	CA	NWS	D
BIL	Billings	MT	NWS	B
BIS	Bismarck	ND	NWS	C
BKW	Beckley	WV	NWS	D
BLU	EmigrantGap	CA	NWS	D
BNA	Nashville	TN	NWS	A
BNO	Burns	OR	NWS	D
BOI	Boise	ID	NWS	C
BOS	Boston	MA	NWS	A
BPT	Beaumont/PortArthur	TX	NWS	C
BRO	Brownsville	TX	NWS	C
BRW	Barrow	AK	NWS	D
BTR	BatonRouge	LA	NWS	B
BTV	Burlington	VT	NWS	B
BUF	Buffalo	NY	NWS	A
BVE	Bootheville	LA	NWS	D
BWI	Baltimore	MD	NWS	A
CAE	Columbia	SC	NWS	A
CAK	Akron	OH	NWS	A
CAO	Clayton	NM	NWS	D
CAR	Caribou	ME	NWS	D
CDB	ColdBay	AK	NWS	D
CDJ	Chillicothe	MO	NWS	O
CHA	Chattanooga	TN	NWS	B
CHS	Charleston	SC	NWS	B
CLE	Cleveland	OH	NWS	A
CLT	Charlotte	NC	NWS	A

SID	LOCATION	ST	AGN	S/L
CMH	Columbus	OH	NWS	A
CNK	Concordia	KS	NWS	D
CON	Concord	NH	NWS	D
COS	ColoradoSprings	CO	NWS	B
COU	Columbia	MO	NWS	C
CPR	Casper	WY	NWS	C
CQC	ClinesCorner	NM	NWS	O
CQT	LosAngeles	CA	NWS	O
CRP	CorpusChristi	TX	NWS	B
CRW	Charleston	WV	NWS	B
CSG	Columbus	GA	NWS	C
CTY	CrossCity	FL	NWS	D
CUT	Custer	SD	NWS	D
CVG	Covington/Cincinnati	KY	NWS	A
CYS	Cheyenne	WY	NWS	C
CZZ	Campo	CA	NWS	O
D07	Faith	SD	NWS	D
DAB	DaytonaBeach	FL	NWS	B
DAY	Dayton	OH	NWS	A
DBQ	Dubuque	IA	NWS	C
DCA	Arlington	VA	NWS	A
DDC	DodgeCity	KS	NWS	D
DEN	Denver	CO	NWS	A
DFW	Dallas/FortWorth	TX	NWS	A
DLH	Duluth	MN	NWS	B
DMH	Baltimore	MD	NWS	O
DRA	Mercury	NV	NWS	D
DRT	DelRio	TX	NWS	D
DSM	DesMoines	IA	NWS	A
DTW	Detroit	MI	NWS	A
EKN	Elkins	WV	NWS	C
ELP	ElPaso	TX	NWS	B
ELY	Ely	NV	NWS	D
ENN	Nenana	AK	NWS	D
ERI	Erie	PA	NWS	C

SID	LOCATION	ST	AGN	S/L
EUG	Eugene	OR	NWS	C
EVV	Evansville	IN	NWS	C
EWR	Newark	NJ	NWS	A
EYW	KeyWest	FL	NWS	C
FAI	Fairbanks	AK	NWS	A
FAR	Fargo	ND	NWS	C
FAT	Fresno	CA	NWS	A
FCA	Kalispell	MT	NWS	D
FLG	Flagstaff	AZ	NWS	C
FMN	Farmington	NM	NWS	C
FNT	Flint	MI	NWS	B
FSD	Sioux Falls	SD	NWS	B
FSM	FortSmith	AR	NWS	C
FWA	FortWayne	IN	NWS	B
GCC	Gillette	WY	NWS	D
GDP	PineSprings	TX	NWS	O
GEG	Spokane	WA	NWS	A
GGW	Glasgow	MT	NWS	D
GJT	GrandJunction	CO	NWS	C
GLD	Goodland	KS	NWS	D
GNA	GrandMarais	MN	NWS	O
GNR	Greenville	ME	NWS	O
GNT	Grants	NM	NWS	D
GRB	Ashwaubenon	WI	NWS	C
GRI	GrandIsland	NE	NWS	C
GRR	GrandRapids	MI	NWS	B
GSO	Greensboro	NC	NWS	B
GSP	Greer	SC	NWS	C
GTF	GreatFalls	MT	NWS	C
GUY	Guymon	OK	NWS	D
HLN	Helena	MT	NWS	C
HNL	Honolulu	HI	NWS	B
HOM	Homer	AK	NWS	C
HON	Huron	SD	NWS	C
HSE	Hatteras	NC	NWS	D

SID	LOCATION	ST	AGN	S/L
HSV	Huntsville	AL	NWS	B
HTL	HoughtonLake	MI	NWS	D
HTS	Huntington	WV	NWS	C
HVR	Havre	MT	NWS	D
IAD	Sterling	VA	NWS	A
IAH	Houston	TX	NWS	A
ICT	Wichita	KS	NWS	A
IGM	Kingman	AZ	NWS	D
ILG	Wilmington	DE	NWS	C
ILM	Wilmington	NC	NWS	C
ILN	Wilmington	OH	NWS	D
IND	Indianapolis	IN	NWS	A
INL	InternationalFalls	MN	NWS	D
INW	Winslow	AZ	NWS	D
IPT	Williamsport	PA	NWS	C
IRK	Kirksville	MO	NWS	D
ISN	Williston	ND	NWS	D
ITO	Hilo	HI	NWS	C
JAN	Jackson	MS	NWS	B
JAX	Jacksonville	FL	NWS	A
JCT	Junction	TX	NWS	D
JDN	Jordan	MT	NWS	D
JFK	NewYork	NY	NWS	A
JKL	Jackson	KY	NWS	D
LAN	Lansing	MI	NWS	B
LAS	LasVegas	NV	NWS	A
LAX	LosAngeles	CA	NWS	A
LBB	Lubbock	TX	NWS	B
LBF	NorthPlatte	NE	NWS	D
LCH	LakeCharles	LA	NWS	C
LEX	Lexington	KY	NWS	C
LGA	NewYork	NY	NWS	A
LGB	LongBeach	CA	NWS	C
LIC	Limon	CO	NWS	D
LIH	Lihue	HI	NWS	C

SID	LOCATION	ST	AGN	S/L
LLJ	Challis	ID	NWS	D
LND	Lander	WY	NWS	D
LNK	Lincoln	NE	NWS	C
LWD	Lamoni	IA	NWS	D
LWS	Lewiston	ID	NWS	C
LXV	Leadville	CO	NWS	D
LYH	Lynchburg	VA	NWS	C
MAF	Midland	TX	NWS	C
MBG	Mobridge	SD	NWS	D
MCG	McGrath	AK	NWS	D
MCI	KansasCity	MO	NWS	A
MCN	Macon	GA	NWS	C
MCO	Orlando	FL	NWS	A
MEH	Meacham	OR	NWS	O
MEI	Meridian	MS	NWS	C
MFD	Mansfield	OH	NWS	C
MFR	Medford	OR	NWS	C
MGM	Montgomery	AL	NWS	B
MHS	Mt.Shasta	CA	NWS	O
MIA	Miami	FL	NWS	A
MKE	Milwaukee	WI	NWS	A
MKG	Muskegon	MI	NWS	B
MKK	Kaunakakai	HI	NWS	C
MLF	Milford	UT	NWS	D
MLI	Moline	IL	NWS	C
MOB	Mobile	AL	NWS	B
MQE	EastMilton	MA	NWS	O
MSN	Madison	WI	NWS	B
MSO	Missoula	MT	NWS	C
MSP	Minneapolis	MN	NWS	A
MSY	NewOrleans	LA	NWS	A
MTP	Montauk	NY	NWS	D
MWT	MountIda	AR	NWS	O
MYL	McCall	ID	NWS	D
N60	Garrison	ND	NWS	O

SID	LOCATION	ST	AGN	S/L
NYC	NewYorkCity	NY	NWS	D
OFK	Norfolk	NE	NWS	D
OGG	Kahului	HI	NWS	C
OKC	OklahomaCity	OK	NWS	A
OLM	Olympia	WA	NWS	C
OME	Nome	AK	NWS	B
OQT	OakRidge	TN	NWS	O
ORD	Chicago	IL	NWS	A
ORF	Norfolk	VA	NWS	B
ORH	Worcester	MA	NWS	C
OTZ	Kotzebue	AK	NWS	B
P28	MedicineLodge	KS	NWS	O
P58	PortHope	MI	NWS	O
P59	CopperHarbor	MI	NWS	O
P60	YellowstoneLake	WY	NWS	D
P68	Eureka	NV	NWS	O
P69	Lowell	ID	NWS	D
P75	Manistique	MI	NWS	O
P92	SaltPoint	LA	NWS	D
PAH	Paducah	KY	NWS	C
PBI	WestPalmBeach	FL	NWS	B
PDT	Pendleton	OR	NWS	C
PDX	Portland	OR	NWS	A
PGA	Page	AZ	NWS	D
PGSN	SaipanIsland	MP	NWS	C
PGUM	Agana	GU	NWS	C
PHL	Philadelphia	PA	NWS	A
PHP	Philip	SD	NWS	D
PHX	Phoenix	AZ	NWS	A
PIA	Peoria	IL	NWS	B
PIH	Pocatello	ID	NWS	C
PIT	Pittsburgh	PA	NWS	A
PNE	Philadelphia	PA	NWS	C
POF	PoplarBluff	MO	NWS	D
PUB	Pueblo	CO	NWS	C

SID	LOCATION	ST	AGN	S/L
PVD	Providence	RI	NWS	A
PWM	Portland	ME	NWS	C
RAP	RapidCity	SD	NWS	C
RBL	RedBluff	CA	NWS	D
RDD	Redding	CA	NWS	C
RDU	Raleigh/Durham	NC	NWS	A
REO	Rome	OR	NWS	D
RFD	Rockford	IL	NWS	A
RIC	Richmond	VA	NWS	A
RIW	Riverton	WY	NWS	D
RMG	Rome	GA	NWS	D
RNM	Ramona	CA	NWS	D
RNO	Reno	NV	NWS	A
ROA	Roanoke	VA	NWS	B
ROC	Rochester	NY	NWS	A
ROW	Roswell	NM	NWS	C
RQE	WindowRock	AZ	NWS	D
RST	Rochester	MN	NWS	C
RTN	Raton	NM	NWS	D
SAD	Safford	AZ	NWS	D
SAN	SanDiego	CA	NWS	A
SAT	SanAntonio	TX	NWS	A
SAV	Savannah	GA	NWS	B
SBN	SouthBend	IN	NWS	B
SCK	Stockton	CA	NWS	C
SDB	Sandberg	CA	NWS	O
SDF	Louisville	KY	NWS	A
SDM	SanDiego	CA	NWS	C
SEA	Seattle	WA	NWS	A
SFO	San Francisco	CA	NWS	A
SGF	Springfield	MO	NWS	C
SHN	Shelton	WA	NWS	D
SHR	Sheridan	WY	NWS	D
SHV	Shreveport	LA	NWS	B
SJT	San Angelo	TX	NWS	C

SID	LOCATION	ST	AGN	S/L
SJU	San Juan	PR	NWS	B
SLC	Salt Lake City	UT	NWS	A
SLE	Salem	OR	NWS	C
SMP	Stampede Pass	WA	NWS	O
SMX	Santa Maria	CA	NWS	C
SNP	St. Paul Island	AK	NWS	D
SNT	Stanley	ID	NWS	O
SPD	Springfield	CO	NWS	O
SPI	Springfield	IL	NWS	C
SPS	Wichita Falls	TX	NWS	C
STC	St. Cloud	MN	NWS	D
STL	St. Louis	MO	NWS	A
SUX	Sioux City	IA	NWS	C
SXT	Sexton Summit	OR	NWS	O
SYR	Syracuse	NY	NWS	A
TCS	Truth Or Consequences	NM	NWS	D
TEB	Teterboro	NJ	NWS	B
TKA	Talkeetna	AK	NWS	C
TLH	Tallahassee	FL	NWS	B
TOL	Toledo	OH	NWS	C
TOP	Topeka	KS	NWS	C
TPA	Tampa	FL	NWS	A
TRI	Bristol/Johnson/Kingsport	TN	NWS	A
TUL	Tulsa	OK	NWS	A
TUP	Tupelo	MS	NWS	C
TUS	Tucson	AZ	NWS	C
TYS	Knoxville	TN	NWS	B
UIL	Quillayute	WA	NWS	D
VCT	Victoria	TX	NWS	D
VTN	Valentine	NE	NWS	D
WAL	Wallops Island	VA	NWS	D
WMC	Winnemucca	NV	NWS	D
YAK	Yakutat	AK	NWS	D
YKM	Yakima	WA	NWS	C
YNG	Youngstown/Warren	OH	NWS	B

SID	LOCATION	ST	AGN	S/L
FAA LOCATIONS				
AUS	Austin	TX	FAA	A
BHM	Birmingham	AL	FAA	B
BIG	DeltaJunction/Ft.Greely	AK	FAA	D
BTT	Bettles	AK	FAA	D
DAL	Dallas	TX	FAA	A
EKO	Elko	NV	FAA	C
FMY	CapeCoral	FL	FAA	C
GFK	GrandForks	ND	FAA	A
GKN	Gulkana	AK	FAA	D
GNV	Gainesville	FL	FAA	C
ISP	Islip	NY	FAA	A
JNU	Juneau	AK	FAA	A
LIT	LittleRock	AR	FAA	A
LSE	LaCrosse	WI	FAA	C
MDT	Harrisburg	PA	FAA	C
MEM	Memphis	TN	FAA	A
OMA	Omaha	NE	FAA	B
PNS	Pensacola	FL	FAA	C
SAC	Sacramento	CA	FAA	C
VRB	VeroBeach	FL	FAA	C